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Letter dated 31 January 2001 from the Chargé d'affaires a.i. of the Permanent Mission of the Solomon Islands to the United Nations and Chairman of the Pacific Islands Forum Countries represented at the United Nations addressed to the Secretary-General

In my capacity as Chairman of the Pacific Islands Forum Countries represented at the United Nations, for January 2001, I have the honour to transmit herewith a paper entitled "Energy and sustainable development: Pacific regional submission to the ninth session of the Commission on Sustainable Development", on behalf of the following members of the Pacific Islands Forum: Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu. The following Pacific Island territories have also endorsed this paper: American Samoa, French Polynesia, Guam, New Caledonia, Northern Marianas, Pitcairn Islands, Tokelau and Wallis and Futuna.

I should be grateful if you would have the present letter and its annex issued as a document of the Commission on Sustainable Development.

(*Signed*) Jeremiah **Manele**
Chargé d'affaires a.i.

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Annex to the letter dated 31 January 2001 from the Chargé d'affaires a.i. of the Permanent Mission of the Solomon Islands to the United Nations and Chairman of the Pacific Islands Forum Countries represented at the United Nations addressed to the Secretary-General

Energy and sustainable development

Pacific regional submission to the ninth session of the Commission on Sustainable Development

December 2000

This submission has been coordinated by the Committee of Regional Organisations of the Pacific (CROP) - Energy Working Group, comprising Pacific Islands Forum Secretariat (FORSEC), South Pacific Applied Geoscience Commission (SOPAC), Secretariat of the Pacific Community (SPC), South Pacific Regional Environmental Programme (SPREP) and the University of the South Pacific (USP) and observers from the United Nations Development Program (Suva) and the Pacific Power Association (PPA). These CROP organisations represent the following Pacific island countries: American Samoa, Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Nauru, New Caledonia, Niue, Northern Marianas, Palau, Papua New Guinea, Pitcairn Islands, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, and Wallis and Futuna. This submission representing a regional consensus position.

Contents

		Page
	Executive Summary	3
	Preamble	7
I	Introduction	8
II	Background	9
III	Key Issues	10
A	Accessibility of Energy	11
B	Rural Energy	12
C	Financing the Energy Sector	13
D	Energy Efficiency	14
E	Advanced Fossil and Nuclear Fuel Technologies	16
F	Renewable Energy	16
G	Energy-related Issues in Transportation	18
H	International Cooperation	18
I	Conclusions	20
	Annexes	21

ANNEX A: Summary of Pacific Island Countries and Territories
ANNEX B: Map of the Pacific Region

ENERGY AND SUSTAINABLE DEVELOPMENT

Pacific Regional Submission to the 9th Session of the Commission on Sustainable Development (CSD9)

EXECUTIVE SUMMARY

The Pacific region acknowledges the vital role of energy in achieving sustained economic growth, especially for the least developed countries, and recognises the complexities and interdependencies inherent in addressing energy issues within the context of sustainable development. This executive summary in particular highlights the areas where the Pacific region differs from the rest of the globe.

Key issues

Pacific island countries face a unique and challenging situation with respect to energy for sustainable development:

- There is a vast difference between the individual country populations and most of the populations are isolated and in very small concentrations. Therefore markets are very thin, difficult to serve, and without economies of scale.
- 70% of people are without access to electricity.
- Most countries are completely without conventional energy resources.
- Existing mechanisms of international co-operation through regional agencies are working well to plan for a sustainable energy future.

Pacific Island countries comprise a wide range of ecosystems and habitats that are predominantly influenced by marine systems. While the Pacific Ocean occupies a vast area, those ecosystems and habitats are confined to small land masses and surrounding seas. Current priority environmental issues that require addressing are:

- Coastal erosion and degradation, including coral reef management.
- Waste management and land based sources of pollution.
- Extreme weather events and disasters.
- Increased urbanization.

Pacific island countries have special concerns arising from their situation that vary from those of larger countries:

- Environmental vulnerability through climate change, sea level rise, habitat loss and pollution resulting from the development and use of conventional energy sources is very high, particularly for small islands and low-lying atolls.
- Pacific island countries are particularly concerned with the magnitude and rapid growth of the emissions from developed countries and want those emissions reduced.
- Energy security is crucial considering their near-total reliance on petroleum imports, in particular for transport, combined with limited storage and high fuel prices.
- The development of renewable sources has been limited in part due to the difficulties of small markets in providing alternatives at reasonable cost.
- There is limited scope for market reforms considering the size and density of markets
- Cultural impacts are serious concerns, therefore, it is important that new technologies are considered to be appropriate.
- The region has limited human and institutional capacity to respond to these challenges and is dependent on foreign aid.

Recommendations arising from these concerns include:

- Analysis and policy recommendations in global fora should take into account the wide sub-regional variation in environmental, social and economic impacts.
- Regional priorities for sustainable development are energy efficiency, renewable energy, environmentally sound energy development and use, and human and institutional capacity building.
- The Pacific has taken a consistent stand against nuclear energy as a source of local energy or as an acceptable energy choice under the Clean Development Mechanism under the Kyoto protocol.
- There should be greater transfers of environmentally sound, efficient, and cost effective technologies.
- Proposals and recommendations at the regional level should utilise existing mechanisms for co-operation through the regional agencies, in order to involve governments and civil society as widely as possible in the planning process.

The Pacific shares many of the same concerns of other counties in the other regions. In the following specific categories, recommendations are listed only where they differ from the widely circulated papers considered at regional UN-system meetings.

A. Accessibility of Energy

The issues related to energy accessibility in the Pacific at the regional and national levels include the following:

- Regional arrangements are needed that could ensure greater reliability of energy supply. Special measures may be required to ensure that countries without any indigenous commercial energy resources can meet their basic requirements.
- Energy markets should take into consideration the absence of conventional energy resources, isolation, and high dependence on petroleum products within the region for energy generation.
- National policies and actions should be adopted to ensure that the basic energy requirements of low-income rural and urban dwellers are met.
- International investment decisions and assistance policies should consider the social grounds for development of the energy sector.

B. Rural Energy

The issues to be addressed with regard to rural energy include the following:

- Effective approaches are needed for the provision of affordable energy technologies to the 70% of population in rural areas.
- Renewable energy service companies (RESCO) should be promoted.
- Detailed information databases on available resources should be established through monitoring, assessment, and evaluation of existing systems and projects.

C. Financing the Energy Sector

The issues to be addressed with regard to finance include the following:

- Pacific island countries need to create a favourable climate for increased investment by the government, private sector and for donor support in energy and related areas.
- Flexible financing mechanisms are needed that include the private sector in equipment supply, project implementation, management and maintenance.
- Prices should be reformed based on the true cost of energy where possible, including environmental and social costs throughout the life cycle of energy services.
- Development finance institutions and commercial banks should be engaged to providing flexible loans for small-scale projects.

D. Energy Efficiency

The issues to be addressed with regard to efficiency include the following:

- National policies, programmes and projects to enhance energy efficiency should be developed and financed using appropriate technologies.
- Supply side management mechanisms should be developed to improve efficiency in production, transmission and distribution of electricity
- Demand side management should be promoted through education, communication, and better technologies.
- Information and education programmes should be conducted in all sectors, including appliance rating and labelling.

E. Advanced Fossil and Nuclear Fuel Technologies

The issues to be addressed with regard to advance technologies for fossil fuels and nuclear energy include the following:

- Advanced fossil fuel technologies are not suitable for adoption in the Pacific region. Equivalent resources should be put into the development of renewable and appropriate energy systems for developing countries.
- Nuclear energy sources are neither appropriate or an acceptable energy choice for use in the region, or for designation under the Clean Development Mechanism under the Kyoto protocol.
- International development assistance should promote access to relevant technologies through concessional financing, partnerships for institutional strengthening, capacity-building, and knowledge transfer.

F. Renewable Energy

The region has significant potential for the use of renewable energy that has not yet been fully realised, but is an appropriate path to greater energy security and environmental integrity. The region is well placed to exploit wind, solar, wave, geothermal and hydropower. The issues to be addressed with regard to renewable energy include the following:

- Effective approaches are needed for the removal of barriers to the widespread use of renewable energy.
- Transfer of environmentally sound, efficient and cost effective renewable energy technologies is required.
- Appropriate approaches to the implementation of renewable energy demonstration projects and programmes, resource assessments, education and training are required.
- Policy options and strategies for the wider scale application of renewable energy need to recognise the diversity and scale of national circumstances.
- Establishment of national, regional and international networks are needed to foster support and co-operation and assist in strengthening local capacity and institutions.

G. Energy-related Issues in Transportation

The transportation sector in the region is one of the major consumers of fossil fuels for energy. Emissions from this sector have serious implications for health, air quality and the environment. The issues related to the transportation sector are:

- Energy efficiency within each transportation mode needs to be raised.
- Fuel quality needs to be improved and monitored.
- Discourage the import of fuel inefficient vehicles so as to ensure that fuel efficient and appropriately sized vehicles are imported.

- Plan and design transportation systems that are efficient, and consider the use of alternative fuels and electric technologies.
- Institute and enforce adequate emission control measures with effective enforcement procedures.
- Promote education programmes that encourage efficient use of transport systems

H. International Co-operation

The major issues in international co-operation are:

- Increase international co-operation to build national capacity, which encompasses creation of public awareness, education and training, and research and development.
- Ensure that the disposal of by-products and residuals such as waste oil, waste chemicals, PCBs, and batteries are adequately addressed in international policies.
- Increase commitments for the development, transfer and application of relevant technology to enable the Pacific to increase its use of renewable energy sources and cleaner fossil fuels.
- Establish energy baselines and develop effective and appropriate systems for the collection of energy and resource data. The collection of solar, wind, geothermal, wave, and tidal data will assist in establishing the resource potential and utilization opportunities for these resources.
- National human capacity and appropriate institutional arrangements, particularly in management, finance and maintenance, should be included as an integral component of programme implementation.
- Regional organisations should continue to play a lead role in providing assistance to the public sector at the regional level to implement policies and regulations, catalysing participatory approaches, and facilitating institutional networks through demonstration projects.
- International and regional organisations should provide assistance in establishing and quantifying the environmental and social impacts of energy use.
- Encourage efforts to achieve greater commitments of development assistance (including the ODA target set at the United Nations Conference on Environment and Development) to be used by recipient countries to address energy and related problems.

ENERGY AND SUSTAINABLE DEVELOPMENT

Pacific Regional Submission to the 9th Session of the Commission on Sustainable Development (CSD9)

PREAMBLE

1. The sectoral focus of CSD9 is "Atmosphere/Energy" and the economic theme is "Energy/Transport". The region acknowledges the vital role of energy in achieving sustained economic growth, especially for the least developed countries, and recognises the complexities and interdependencies inherent in addressing energy issues within the context of sustainable development.

2. This Pacific regional submission to CSD9 is on behalf of the independent Pacific island countries that are members of the Pacific Islands Forum and member States and Territories that are members of other regional organisations in particular those involved in energy sector issues.

3. The submission has been coordinated by the Committee of Regional Organisations of the Pacific (CROP) - Energy Working Group, comprising Pacific Islands Forum, South Pacific Applied Geoscience Commission (SOPAC), Secretariat of the Pacific Communities (SPC), South Pacific Regional Environmental Programme (SPREP) and the University of the South Pacific (USP). These organisations represent (22) Pacific island countries whose governments and energy units along with other relevant organisations in the region have reviewed and adopted the recommendations of this submission. Contributions were also received from United Nations Development Programme (Suva) and the Pacific Power Association (PPA). All of these island countries are considered as small-island developing states (SIDS) and are also represented through the Alliance of Small Islands States (AOSIS).

4. This submission has been prepared to take into account the following:
   - A Special Session of the United Nations General Assembly was held in September 1999 to review the implementation of the Barbados Programme of Action for SIDS. The Pacific regional submission to CSD-7 essentially focused on this review, and much of that review was relevant to the CSD-8 where the sectoral theme was of integrated planning and management of land resources;
   - The 1992 Rio Earth Summit declaration and the 22nd Special Session of the United Nations General Assembly endorsed the linkages between energy, climate and sustainable development. The quest for enhancing energy efficiency and promoting renewable energy will achieve the two goals of reducing greenhouse gas emissions and the dependency of imported fossil fuels.
   - Although the focus of CSD9 has been global in nature, it is also important to appreciate national and regional situations, identifying where possible the variation in the needs and priorities within different Pacific island countries. Regional initiatives continue to address the many energy sector related issues that concern the Pacific island countries, such as development of National Energy Policies and the Pacific Islands Climate Change Assistance Programme (PICCAP) assisting in the preparation of National Communications and Greenhouse Gas Inventories.
   - In addition to the existing regional organisations, the Pacific island countries pursue sustainable energy development in collaboration with the Caribbean and Indian Ocean under the umbrella of the Alliance of Small Islands States (AOSIS).

I. INTRODUCTION

5. The Pacific island countries continue to share a common aspiration for economic development and improved living standards while at the same time remain strongly committed to conserving the natural and cultural heritage upon which their future depends. This submission to the Ninth Session of the Commission on Sustainable Development aims to build on agreements already reached by Pacific island countries and the international community concerning the sustainable development of Small Island Developing States. It provides a measure of progress towards sustainable development in this region and identifies where special attention is required to further its implementation.

6. The Pacific island countries can generally be considered in the context of small populations – a total of 6 million, on often tiny islands – more than 1100, and spread over a huge area of ocean – some 30 million square kilometres. This providing a setting that is very much unique on the global scene. This context has for generations directly impacted the lives and well being of all Pacific peoples and is deeply enshrined in traditional and cultural values and practices. Over the past one hundred years, with increased access to the "outside world" and the onset of globalisation, there has been a big change in the aspirations for a "better quality of life" for Pacific people. Key problems include contamination from waste, coastal degradation, urbanisation, and the continuing decline in human and institutional capacity health.

7. Coastal communities dominate in the region. Population is increasing, and in some places as a result of "urban drift" the rate of increase is alarming. These changes are leading to stress on the island system with an increased demand for resources. Impacts from extreme weather events and disasters have had profound consequences.

8. Further stress on the island system is occurring as countries develop. Their reliance on fossil fuels has increased, in particular for producing electricity. Another high energy-consuming sector is transport, including sea transport. It is therefore important to acknowledge that in providing access to energy sources, in particular electricity, there is significant opportunity to utilise renewable energy sources. Although renewable energy technologies such as solar, hydropower, biomass and to a lesser extent wind have already been utilised in a number of the Pacific island countries to improve, communication, health, education and some small cottage industry, there remain significant opportunities and potential to further develop these renewable energy resources. However, for the Pacific island countries there are still a number of constraints and barriers to the exploitation and integration of these renewable energy technologies into the urban and rural sectors.

9. The region acknowledges that the objectives envisaged for sustainable energy futures should reflect the need for adequate energy supplies and increasing energy consumption in developing countries. The increase in the level of energy services will have a beneficial impact on poverty alleviation and social and gender equity by increasing employment opportunities and improving transportation, health and education. While countries are individually making advances towards sustainable energy utilisation, and all parties can benefit from progress made in other countries, there remains a significant amount of ground to be covered.

10. The Pacific island countries remain heavily dependent on fossil fuel based systems of energy generation that are frequently environmentally and economically unsustainable and not equitably available to remote populations. This dependency makes them vulnerable to increased costs and uncertain supplies which slows the sustainable development of Pacific island countries, particularly in rural areas.

11. In the broader context of energy with in the region, it is important that future opportunities be enhanced not only through regional initiatives but also by aligning where applicable and appropriate with the wider global energy agendas. Not withstanding the insignificant emissions of greenhouse gasses from the small Pacific island countries, the potential for actions leading to use of non-carbon energy sources will ensure a more sustainable energy path for the future. Most Pacific island countries have already embarked on projects and activities in the context of the commitments under the United Nation Framework Convention on Climate Change (UNFCCC), which have led to significant abatement in the levels of greenhouse gas emissions.

12. It is imperative that the Pacific Island countries are provided financial and technical resources to assist in their visions for the exploitation and use of new and alternative forms of energy. International and regional cooperation are important to ensure the promotion of energy conservation, improvement of energy efficiency, adoption of renewable energy technologies, and the development and dissemination of innovative energy-related technologies. The CSD9 is therefore requested to seek support from the international community to assist Pacific island countries in implementing the recommendations in this submission.

II. BACKGROUND

13. In recent years the need for and importance of energy in the region has increased significantly in particular in relation to the global agenda and associated issues such as changing climate and, sea level rise. The essential role of energy for economic and social development and the increasing need to reduce negative environmental impacts has been noted. Furthermore, the need for sustainable patterns of production, distribution and utilisation of energy are of critical importance to the above-mentioned objectives, and are among the issues facing the challenge of energy for sustainable development.

14. Energy consumption is often regarded as an important indicator of economic development of a nation. For households, access to different types of energy sources is a key indicator of the standard of living: changes in these proportions would, consequently, provide evidence of the development path. The commercial/industrial sector is fuelled by energy. The Pacific island countries energy use in these sectors is dominated by imported fossil fuels, mostly petroleum. Indeed, the region can be regarded as among the world's most dependent on fossil fuels for their economic development.

15. In terms of energy imports, Pacific island country energy imports account for 15-25% of total imports and over 40% of the gross domestic commodity exports. A Pacific Regional Energy Assessment (PREA) (1992) report showed the tremendous impact of petroleum imports on the economy. The ratio of petroleum imports to total exports is very large for most Pacific island countries, between 40 - 80%, and alarmingly so for some countries where the figures are as high as 500%. This constitutes a dangerous dependency situation, for in case of a major disruption in the fuel supply due to global shortages, rising prices, conflicts or other causes, the consequences would be dramatic.

16. Most of the imported energy is used either for transportation or for the generation of electricity. This is compounded by the fact that the fuel prices in the region tend to be 20-30% higher than world market prices. The recent increase in oil prices have had a major effect on the Pacific island country economies.

17. Approximately 50% of the total energy used in the Pacific island countries is from indigenous, local sources. These consist mainly of biomass (fuelwood, bagasse, coconut husk and shell) hydro and small amounts of solar and wind energy.

18. On average individual Pacific islanders are responsible for producing approximately one quarter of the per capita CO_2 emissions attributable to the average person world wide. This means that that Pacific island countries account for some 0.03% of the global emissions of CO_2 from fuel combustion despite having around 0.12% of the world's population. This can be compared to the 29 OECD countries, which account for just over 50% of the total global emissions from fuel combustion, with approximately 20% of the world's population.

19. Transportation accounts for over half the petroleum use in most Pacific island countries. This is equivalent to about 680000 tonnes of petroleum per annum. A nominal increase of 5% in vehicle efficiency would reduce GHG emissions by approximately 30,000 tonnes of carbon or over 108,000 tonnes of CO_2. This kind of analysis shows the potential for reducing carbon emissions from the transportation sector. Combined with other strategies, the resulting benefits on the environment and the economy are likely to be significant.

III. KEY ISSUES

20. In comparison to other regions on the globe the primary source of electricity for the Pacific region is predominantly from fossil fuels. Although the Pacific's consumption is insignificant, as are its associated greenhouse gas emissions, the region is particularly vulnerable to climate change and sea-level rise resulting from the emissions of larger developed countries. This is particularly important to the very low-lying coral atoll countries within the region with limited land area.

21. Although energy is linked to major global issues such as economic development, poverty alleviation and social development, there are a number of other related issues such as gender concerns, transportation, health, environmental quality, and energy supply security. Therefore, even though the importance of energy for sustainable development is well recognised by the international community, there is still a lack of understanding of the full range of challenges in the region that requires immediate attention.

22. However, it should be noted that there is a wealth of experience in the region in urban and rural energy supply systems and programmes. Most of the larger projects and a significant number of smaller renewable energy and alternative technology projects have been reported on and these experiences continue to be used in the region to improve current and proposed projects and programmes. Notwithstanding this source of information, there remain other important parameters that preclude the Pacific island countries from addressing all the demands in the energy sector as they strive to achieve a sustainable position.

23. The magnitude and scale of the energy problem facing the region today in relation to sustainable human development and environmental objectives can be gauged by the fact that within the Pacific island countries it is estimated that approximately 70% of people do not have access to electricity. Many of these people live on remote islands or in isolated inland rural areas. Significant disparities exist between countries in their level of development and energy consumption. In the same context the linking of "access to energy" and "transportation services" is a highly important issue for Pacific island countries due to their small and dispersed nature over thousands of kilometres of ocean.

24. The long-term sustainability of energy production and distribution relies on the ability of the region to develop appropriate and affordable systems. Traditionally, commercially proven energy generation systems using fossil fuels, and to a lesser extent hydropower, have been adopted by the regions power utilities. As new and renewable energy sources such as wind and solar photovoltaic systems become financially and economically viable they have the potential to be adopted where appropriate. The adoption of renewable energy sources has addressed some of the health and environmental consequences of energy production in an attempt to pursue a sustainable energy future.

25. In considering the sectoral theme of "Atmosphere/Energy" and the economic theme of "Energy/Transport" the following key issues have been identified and are elaborated in the following sections of this submission:

(a) Accessibility to energy needs to be reliable, at affordable costs for both urban and rural consumers, and thereby contribute to security of energy supply.

(b) Improvements in rural energy require the development of financing mechanisms, reduced systems costs, and improved local capacity in management, finance, and maintenance.

(c) Improved finance of energy services requires pricing reforms based on true costs with consideration for environmental and social costs electricity tariffs that provide a basic level of affordable energy to all people, and increased resources on flexible terms.

(d) Efficiency needs to be improved in electricity production, conversion, distribution and utilisation.

(e) Advanced fossil fuel technologies are not yet appropriate for the Pacific island countries, and should be foregone in favour of more appropriate technologies. Nuclear technologies are not acceptable as an option under the clean development mechanism.

(f) Renewable energy programmes need to accelerate development of components and enhance transfers of appropriate technology to achieve higher levels of efficiency and lower costs.

(g) The transportation sector should improve energy efficiency, thereby reducing environmental and health impacts through the reduction of emissions.

(h) The priorities for international cooperation are for human and institutional capacity building, mobilisation of private and public investment capital, and transfer of appropriate energy technologies.

(i) Progress on these key issues requires effective and appropriate systems for the collection of energy supply, demand, and resource data. The collection of solar, wind, geothermal, wave, and tidal data will identify utilisation opportunities for these resources.

(j) With regard to the environmental impacts of energy use, the Pacific island countries are particularly concerned with the magnitude and rapid growth of emissions from developed countries and believe they should take the lead in reducing emissions.

A. Accessibility of Energy

Situation and Challenges

26. Accessibility of energy varies widely within the Pacific region. It is estimated that in the Pacific island countries approximately 70% of the people do not have access to modern energy services, with many of these people living on remote islands or in isolated inland rural areas. This is a greatly different picture to the global situation where approximately 30% are without access to modern energy services. Meeting the basic energy requirements and sustainable socio-economic development needs of people with subsistence incomes remains a top priority.

27. Aside from a relatively limited amount of energy that is generated from hydropower in the region the balance is provided from diesel fuel. There is still a high demand in the

region for access to energy resources and energy services. As a number of these resources are unevenly distributed there remains the ongoing need to ensure the efficient use of these resources, to ensure the resources are not over exploited and are utilised in an efficient manner. Therefore there is a need to ensure the availability of energy services in a reliable way and at affordable costs within both national and regional contexts, thereby contributing to security of energy supplies.

28. As an over arching requirement there is also the need for appropriate energy policies (rural and national) that are implemented in a consistent manner. In particular these should be founded on sound policy objectives, consistently observed and maintained so as to reduce the chance of inconsistencies developing which will lead to instability, insecurity, and lack of general confidence that is required for investors to make serious long term investments in the region.

Strategies and Recommendations

29. In considering energy accessibility at the regional and national levels the following main strategies and recommendations have been identified:

(a) Provide reliable energy markets that can generate a profitable income for producers.
(b) Utilise the introduction of electricity so as to assist in generating economic activities.
(c) Establish greater reliability of the energy supply at an affordable cost.
(d) Utilise renewable natural resources to meet energy demands where economically and financially feasible so as to reduce the high dependence on imported petroleum products used for electricity generation.
(e) Adopt national policies, strategies and actions that ensure the basic energy requirements of low-income rural and urban dwellers are met with modern energy services at an affordable cost.
(f) Seek increased official development assistance for international and regional funding cooperation in the development of national sustainable energy strategies.

B. Rural Energy

Situation and Challenges

30. Issues confronting rural commercial energy are wide ranging. The provision of energy services to rural areas remains inadequate due to the often dispersed and isolated nature of the population. Access to these rural areas or isolated islands can be difficult due to the lack of adequate infrastructure or services and the ability to contribute towards the payment for these services is hindered by low-income levels. Although, in a number of countries, there has been an integrated approach to rural development (energy, health education, agriculture and environment) the successes and penetration is still relatively limited.

31. A significant amount of assistance has been provided in the region on the development of national energy policy statements and also rural electrification policy statements and guidelines. The objective of developing these statements has been to assist with the overall integration of energy into rural development strategies; improving the quality and quantity of information on the availability and use of energy in rural areas both for use by policy makers, suppliers and the consumers. Unfortunately, frequently there has been inconsistency and a lack of commitment given to the adoption and implementation of energy policies and operational guidelines.

Strategies and Recommendations

32. In considering rural energy at the regional and national levels the following main strategies and recommendations have been identified:

(a) Establish opportunities for better access to renewable energy technologies (such as stand-alone solar systems and hybrid) in rural areas through the removal of barriers and obstacles to sustainable rural energy sector development.
(b) Ensure that appropriate technologies are adopted to provide the desired level of service, that projects are environmentally sound and opportunities are taken to use clean and efficient technologies so as to reduce the vulnerability to the environment and impact of climate change and sea-level rise.
(c) Establish policies and mechanisms relating to funding and financing for projects and programmes, including fee collection.
(d) Develop human and institutional capacity in management, finance and maintenance.
(e) Provide opportunities and encourage the participation of rural energy service companies, the private sector, local companies and manufacturers to supply equipment, for project implementation, management and maintenance.
(f) The need to capitalise on opportunities to establish manufacturing and process plants in developing countries where applicable.
(g) Ensuring that the environment and livelihood of rural communities are not disadvantaged through the implementation of rural energy systems.
(h) Establish detailed information databases on resources available and the assessment of energy requirements, existing systems and projects.
(i) Encourage improvement in the efficiency of renewable energy components and systems whilst ensuring that the prices are also reduced.

C. Financing the Energy Sector

Situation and Challenges

33. The Pacific region continues to face problems in securing funding for development of the energy sector, in particular for the rural communities. Within individual countries there is the lack of commitment to longer-term investment and support for programmes, which therefore restricts development. In general the energy sector within the region is seen as one of the sectors that continues to drain national economies considering that the greater percentage of import costs are for fossil fuels on which the energy sector is reliant. However, it provides great opportunity for future investment for development.

34. Considering the ongoing requirements for capital and the need for appropriately skilled human resources (management and technical), there still remains a major challenge facing the region as a whole and the countries individually as how to mobilise the investments necessary for sustainable energy systems. Problems relating to the financial viability of public electric utilities have affected timely improvements in efficiency in the generation, transmission and distribution of electricity, as well as in the management of demand. It has also been found that regional energy programmes in the past decade have heavily focussed on renewable energy and therefore this imbalance sees the main utility generation and its associated needs being neglected.

35. In a number of cases some of the long-term donor funding provided to the region has been found not to establish a true position of sustainability, but experience and lessons learnt from these earlier projects in the region has shown that this need not be the case. Projects and programmes in the region have been sustainably developed through

continual technical assistance, but this assistance needs to be ongoing and consistently applied on the order of 10 years.

Strategies and Recommendations

36. In considering financing the energy sector at the regional and national levels the following main strategies and recommendations have been identified:

(a) Encourage the structuring of electricity tariffs so as to provide a basic level of affordable energy.
(b) Encourage developers to invest through incentives and a secure market with the appropriate scale economies and opportunities for the future.
(c) Provide institutional strengthening and assist with developing and implementing legislative reforms.
(d) Encourage and establish the environment, and provide opportunities for corporatisation and privatisation.
(e) Assist in developing pricing mechanisms and reforms based on true costs with consideration for environmental and social costs throughout the life cycle of the energy services.
(f) Introduce customs duties, tax concessions and market transformation initiatives to encourage efficiency throughout the energy sector.
(g) Use government procurement programmes to achieve scale economies.
(h) Engage development finance institutions and commercial banks in providing loans for small-scale projects, and promote innovative financing arrangements, especially for low-income inhabitants.
(i) Encourage the private sector and local communities to provide energy services, particularly in rural areas, and contribute to achieving the intended goals through capacity building at the corporate and community levels.

D. Energy Efficiency

Situation and Challenges

37. In the Pacific the greater proportions of energy are consumed in the production and distribution of electricity followed by transport and then to a lesser degree, industry and agriculture. Improving the efficiency of energy production and distribution and utilisation will lead to a reduction of the energy consumption per unit product or activity, but the Pacific has been relatively poor at adopting energy efficiency practices and designs. This stems from lack of policy, lack of information and education, and the fact that there has been a reticence of consumers and energy suppliers (power utilities) to make investment up front to achieve future savings. It has been well demonstrated and recognised that making energy systems more efficient contributes to reducing costs, (thereby improving access to energy), reducing imported fossil fuels, reducing demand, improving local air quality and the reduction of greenhouse gases.

38. The power utilities have for some time suffered from a number of deficiencies. Effectively there has been a lack of human resources skilled in the area of power system analysis, design, and effective operating and maintenance procedures that limited the ability of the utility to address energy efficiencies particularly in the power system. In addition the equipment used in the power system have contributed to the inefficiency in power production and distribution as a result of inadequacies in procurement specification.

39. Many technological opportunities exist for improving energy efficiency in residential and commercial buildings, industry, transportation, agriculture and forestry. While numerous technologies to improve energy efficiency and manage energy demand more effectively

are readily available, new developments can enhance the potential of this option further. A major part of industrial energy is utilised by the light-manufacturing industries. Although the scale within the region is relatively small from a economic basis there does exist opportunities for the improvement and more efficient use of materials, including the recycling of materials and management of waste, thus assisting in reducing energy demand and greenhouse gas and other polluting emissions. One of the overarching factors limiting the penetration and development of these opportunities has been the lack of emphasis placed on education and information transfer.

Strategies and Recommendations

40. In the consideration of policies and measures to achieve wider gains in energy efficiency, the issues of main importance can be classified into the following main categories:

(a) Constraints and barriers that need to be addressed and the measures required in overcoming them;

(b) Improving the efficiency of production, transmission and distribution of energy and materials; and

(c) Energy efficiency improvement in industry, public, residential and commercial buildings and agricultural sectors.

41. In considering energy efficiency by addressing the constraints and barriers, the following main strategies and recommendations have been identified:

(a) Identify clearly the constraints and barriers to take full advantage of energy efficiency measures, particularly in the production and distribution of energy, and the utilisation of energy in industrial, commercial and domestic sectors.

(b) Address the lack of skilled human resources, develop clear appropriate policies, technology choices, taxes, duties, subsidies and rebate incentives. The resolution of these will contribute to energy efficiency, to reduction in energy demand and greenhouse gas and other polluting emissions.

42. In considering energy efficiency associated with the production and distribution of energy, the following main strategies and recommendations have been identified:

(a) Identify and adopt where economically and financially viable more efficient and power production and distribution technologies, and facilitate their transfer to other less developed countries in the region where appropriate.

(b) Carry out a power system losses assessment in the power utilities in the region, and implement a loss reduction programme, and develop appropriate specifications for the procurement of power supply equipment that will not contribute to energy inefficiencies.

(c) Carry out a human resource development needs assessment of the power utilities, and implement an institutional strengthening programme in those areas that will increase the ability of the power utility to improve energy efficiency.

43. In considering energy efficiency associated with the utilisation of energy, the following main strategies and recommendations have been identified:

(a) Create appropriate energy policies, standards and incentives that act as drivers for the conservation of energy and the acquisition of energy efficient consumer appliances.

(b) Establish energy audit mechanisms and monitoring systems.

(c) Encourage the creation energy service companies.

(d) Support research, development and demonstration.

(e) Disseminate technology options for improving end-use energy efficiency in the residential and commercial buildings sector include wider diffusion of technologies, such as more efficient equipment and appliances; efficient heating and air-conditioning systems; and more efficient building envelope designs. The introduction and adoption of regulatory mechanisms relating to the importation of energy efficient appliances and

equipment through star rating programmes and the introduction of minimum energy performance standards (MEPS) for equipment and appliances will assist in meeting these requirements.

(f) Consider institutional mechanisms that are required for regulatory and legal frameworks for implementing policies on incentives; energy efficiency standards and labelling of equipment; and inviting the private sector and communities to contribute to achieving the intended goals.

E. Advanced Fossil and Nuclear Fuel Technologies

Situation and Challenges

44. Advanced fossil fuel technologies have matured in some of the industrialised countries however, the greater majority of these are still not suitable for adoption in the smaller developing countries. It is recognised that if equivalent resources were put into the development of renewable and appropriate energy systems for developing countries that this would undoubtedly lead to the reduction of environmental impacts by way of efficiency improvements and reduced pollutant emissions. The emissions from fossil fuel combustion themselves have national, regional and global impacts. As the economies of developing countries expand in association with higher levels of consumption of energy, the resulting increase of emissions could be contained through more appropriate technology.

45. While addressing these issues the region is very clear on it's nuclear free policy. Nuclear energy sources are not considered appropriate nor acceptable for use in the region regardless of the individual claims that the utilisation of these types of advanced technologies are characterised by very low pollutant emissions and reduced costs in meeting environmental objectives.

Strategies and Recommendations

46. In considering advanced fossil and nuclear fuel technologies at the regional and national levels the following main strategies and recommendations have been identified:

(a) Inappropriate technologies and energy generating technologies not commercially proven including improved nuclear energy technologies should not be introduced.

(b) Identify suitable acceptable energy sources to meet the higher levels of energy consumption as the economies of developing countries expand, without further impacting on the region.

(c) Improve regional and international cooperation arrangements that assist in facilitating capacity development and the transfer of acceptable and relevant technology to reduce the environmental impact of the development of fossil fuels and to reduce the associated local health hazards and environmental pollution.

F. Renewable Energy

Situation and Challenges

47. Renewable energy in its modern forms is a regional priority. However, in total, it plays a relatively minor role in the total energy balance. The general need is for increased development and utilisation of renewable energy sources, implementation of better financial schemes for smoothing initial capital costs, improved system efficiency, and well-structured demonstration and training activities/programmes.

48. Although nearly all countries in the region have adopted strategies for promoting renewable energy, successes have been limited. The capital cost of renewable energy technologies still remains relatively high in comparison to the alternate traditional fossil fuel options, along with a number of other distinct barriers and constraints. Policy options and strategies for the wider application of renewable energy need to recognise the diversity of national circumstances, as well as the need for guidelines for the adoption of appropriate technology options.

49. Assistance continues to be provided within the Pacific region in developing national energy policy statements. These policies link renewable energy to sustainable development, consistent with environmental, legal, and regulatory policies and frameworks. These statements provide a framework for attracting investment; and a clear policy message to key actors and donors.

Strategies and Recommendations

50. In considering renewable energy policies at the regional and national levels the following main strategies and recommendations have been identified:

(a) Increase development and utilisation of renewable energy sources through national and regional efforts and international cooperation, specifically to increase technology transfer and investments in mature renewable energy technologies.

(b) Compare the real environmental costs of fossil fuel and renewable alternatives, including global emissions.

(c) Strengthen national capacity in policy, institutions, technology, financing and commercialisation.

(d) Consider gender and specific energy concerns of women, public participation, grass-roots involvement, competition between food and biomass energy, and other priority community needs such as access to water, education and information.

(e) Intensify renewable energy development in view of its potential for the reduction of emissions in the context of the clean development mechanism.

(f) The regional organisations should continue to provide assistance to the public sectors on policy and regulation, to provide the necessary interface for programme promotion, to serve a catalytic role by providing public information, to encourage participatory approaches involving NGOs and community-based organisations; and facilitate institutional networks through demonstration projects.

(g) Increase funding for the development of national / regional renewable energy expertise.

51. In considering renewable energy technologies at the regional and national levels the following main strategies and recommendations have been identified:

(a) Establish regional networks and centres of excellence for the exchange of experience in the development and application of renewable energy, research and development cooperation, including joint development projects, the sharing of testing and training facilities and South-South cooperation for capacity-building.

(b) Disseminate technology options at the national, regional, and international levels for mature solar, wind, biomass and other renewable energy technologies.

(c) Learn from past experience and establish closer links between research, development and industry.

(d) Promote trade in renewable energy devices and systems and facilitate the creation of an enabling environment for rapid market growth.

(e) Support national efforts to build organisational and manufacturing capacity for the production and diffusion of renewable energy technologies.

(f) Strengthen linkages between existing regional and international mechanisms, such as the Global Environment Facility, and renewable energy technology development and utilisation.

G. Energy-related Issues in Transportation

Situation and Challenges

52. The transportation sector is a predominant consumer of imported energy and this is of serious concern regionally as well as internationally. Although the demand continues to grow this increase this has not been as high as it could have due to the improvement in the efficiency of vehicles and technological advances. In the past the transport sector has frequently been neglected and therefore needs to be incorporated into long-term plans. National-level policies can focus on increasing efficiency, developing markets and technologies for alternative fuels and vehicles and putting in place adequate emission control measures with effective enforcement procedures.

53. The environmental impact of transportation fuels related to carbon dioxide and other polluting emissions have stimulated research and development on alternative fuels and technologies. The available alternative transportation fuels that have attracted the most interest and for which technology is actively being tested and developed are natural gas, electricity, liquefied petroleum gas, methanol, ethanol, coconut oil, rape seed oil, methyl ester and hydrogen. Passenger vehicles offer the greatest opportunity for improving energy efficiency and reducing environmental impacts using advanced technology and alternative fuels. In the future the possibility will exist to consider these alternate fuels for use in the transport sector. As has been the case with new technologies in other sectors there will be a significant requirement for training, education, public awareness and new infrastructure.

54. The major policy objectives in the transportation sector are to ensure the efficient and effective use of the transportation system to underpin growth in economic activity, ensure that energy policies do not adversely affect the ability of the transportation system to meet the needs of all sectors of society for mobility and accessibility and mitigate the adverse impacts of transportation-related activities on human health and productivity and environmental quality. The implementation of these policies and regulatory mechanisms will help reduce local air pollution, national and regional acidification and greenhouse gas emissions.

Strategies and Recommendations

55. In considering energy-related issues in transportation at the regional and national levels the following main strategies and recommendations have been identified:

(a) Promote as appropriate alternative fuels ensuring that technologies are fully proven, the costs are affordable, training and public awareness is provided, and the necessary infrastructure to establish these is available.
(b) Improve energy efficiency within each transportation mode, including sea transport.
(c) Ensure the importation and supply of cleaner and better quality fuels.
(d) Improve the effectiveness and availability of public transport systems.
(e) Discourage the import of fuel inefficient vehicles.
(f) Institute and enforce adequate emission control measures with effective enforcement procedures.

H. International Cooperation

Situation and Challenges

56. The situation faced by Pacific island countries underscores the need for intensifying national, regional and international cooperation, in order to move towards sustainable patterns of production, distribution and utilisation of energy. Many issues lend

themselves to constructive dialogue and genuine partnership based on mutual interests and benefits at the international level, and point to the need for private-public partnerships, both domestically and internationally, and both bilaterally and multilaterally.

57. Official development assistance (ODA) remains a significant source of external funding for many developing countries. Moreover, it plays an important complementary and catalytic role in promoting sustainable development. However, there are opportunities to improve the effectiveness and sustainability of support to the energy sector and related programmes. Development partners can help by strengthening international and regional cooperation in the field of energy. Two areas of great potential are: domestic efforts to provide adequate modern energy services to all sections of the population in an environmentally sound manner, and policies and plans that take into account the economic, social and environmental aspects of the production, distribution and use of energy. Noting the requirement for the proper management, handing and disposal of by products and residuals such as waste oil, waste chemicals, PCBs, batteries etc. and that these are adequately addressed.

58. Pacific island countries need to create a favourable climate for increased investment by the international community, including the private sector. It is anticipated that this could be achieved by adopting relevant policies, fiscal incentives and long-term investor security. This will assist in securing donor support for activities in energy and related areas. In addition will assist in the effort to mobilise capital for investment in support of sustainable energy development.

59. There is, therefore, a need for an evolving commitment to increased investments and financial flows, for the transfer of relevant technology and for promotion efforts in research and development in these areas. It is also of crucial importance that international cooperation also be directed at building human and institutional capacity.

Strategies and Recommendations

60. In considering international cooperation at the regional and national levels the following main strategies and recommendations have been identified:

(a) Provide information on the available and appropriate international mechanisms that can be utilised effectively to transfer acceptable clean technologies.

(b) Provide to Pacific island countries information regarding financial and technology developments taking place worldwide.

(c) Facilitate the formulation and application of appropriate standards in the production, conversion, distribution and utilisation of the various energy services.

(d) Increased financial support from multilateral financial institutions through concessional mechanisms to developing countries in support of their efforts in implementing sustainable energy development programmes and projects.

(e) Assist in developing economic and financial instruments including restructuring; liberalisation; privatisation of the financial and energy sectors and the proposed clean development mechanism.

(f) Assist in efforts of human and institutional capacity strengthening through training programmes and regional centres.

IV. Conclusions

61. Energy plays an important and critical role in the Pacific region. The very fact of remoteness from international markets, the very diverse and sparse spread of the countries over a large ocean area causes the region to be unique. These factors make it imperative to have the proper skills and management so as to be able to achievement of the goals of sustainable development.

62. Examination of some of the key issues in the debate on energy and sustainable development clearly show that achieving a sustainable future will require the concerted effort at all levels of Government, the private sector, society and the international community.

63. Therefore the key issues identified throughout the paper have been highlighted here as those that are required for the region so as to achieve the long-term object of sustainable energy supply and demand for the region.

ANNEX A: A SUMMARY OF PACIFIC ISLAND COUNTRIES AND TERRITORIES

	Political status	Land area (sq km)	EEZ (million sq km)	Population (1998-99 estimate)	GDP per capita (US$)	Geographic type	Main energy issues	Importance of the energy sector
American Samoa	Unincorporated US territory	240	0.39	61,100	4,660	High islands, with a few atolls		
Cook Islands	Self-governing in free association New Zealand	237	1.83	16,500	4,947	High islands and atolls	Cost effective electricity supply Pilot sustainable renewable energy Projects Capacity building	Priority in economic development
Federated States of Micronesia	Self-governing in free association with US	702	2.78	116,400	2,070	High islands and atolls	Heavy reliance on fossil fuels High cost of supply of petroleum products Human and institutional capacity building Transfer of appropriate technology to diversify energy resource base Commercialisation / Corporatisation of utilities Environmentally sound / efficient use of energy	Sustainable social and economic development
Fiji	Independent state	18,333	1.29	801,500	2,864	High islands a few minor atolls	Heavy reliance on fossil fuels Commercialisation of rural electrification /electricity supply Capacity building	Economic development
French Polynesia	Overseas territory of France	3,521	5.03	222,300	16,750	High islands and atolls		
Guam	Unincorporated US territory	541	0.22	149,600	15,541	High island		
Kiribati	Independent state	811	3.55	88,600	702	Predominately Atolls	Rural electrification Sustainable electricity utility for urban areas Energy efficiency and conservation Reducing the cost of landed petroleum products	To increase the standard of living of nationals through an accessible, cost effective and environmentally friendly energy technologies
Marshall Islands	Self-governing republic in free association with US	720	2.13	63,200	1,182	Atolls		
Nauru	Independent state	21	0.32	11,300	3,450	Raised coral Island	Heavy reliance on fossil fuels Limited human and institutional capacity Requirement for energy information	To realise the economic significance and benefits of renewable energy and other technologies

	Political status	Land area (sq. km)	EEZ (million sq. km)	Population (1998-99 estimate)	GDP per capita (US$)	Geographic type	Main energy issues	Importance of the energy sector
New Caledonia	Overseas territory of France	18,576	1.74	202,800	13,301	High island		
Niue	Self-governing in free association with New Zealand	259	0.39	2,100	3714	Raised coral Island	Promote the use of renewable energy Heavy reliance on fossil fuels Protection of the environment	To reduce the dependence on fossil fuels by using renewable energy Economic development
Palau	Self-governing republic in free association with the US	475	0.63	18,100	5.330	High islands and atolls		
Papua New Guinea	Independent state	462,243	3.12	4,692,400	1196	High islands – a few small atolls	Reliance on fossil fuels Use of renewable energy Environmental protection	Priority in the resource development plan
Pitcairn	British Overseas Territory	4.5	0.80	40		One volcanic island and 3 coral atolls	Heavy reliance on diesel fuel Logistical difficulty with storage and the high cost of transport of diesel fuel	Provision of electricity to the public and the ability to maintain a basic standard of living for citizens
Samoa	Independent state	2,935	0.12	168,000	1060	High islands	Develop human and institutional capacity Effective planning and management for development of sustainable energy projects Acceptance and enforcement of performance and environmental standards backed by appropriate legislation	Social and economic development Sustainable development and energy projects (renewable) Energy efficiency and conservation
Solomon Islands	Independent state	28,370	0.60	408,400		High islands – a few atolls		
Tokelau	Dependency of New Zealand	12	0.29	1,500		Atolls	High reliance on fossil fuel Human and institutional capacity requires developing Conservation and energy efficiency	Economic development by improving the quality of life and employment opportunities

	Political status	Land area (sq km)	EEZ (million sq km)	Population (1998-99 estimate)	GDP per capita (US$)	Geographic type	Main energy issues	Importance of the energy sector
Tonga	Independent kingdom	649	0.07	100000	1157	High islands – a few small atolls	Dependence on imported petroleum products Insufficient human and institutional capacity Lack of information and energy awareness Limited financial mechanisms	Priority in developing rural / remote areas and commercial activities
Tuvalu	Independent state	26	1.30	9,600	1157	Atolls	High dependence on imported petroleum products for Power generation and transport Electrification of outer islands Requirement to further develop renewable energy projects	Control impact of energy projects on the environment Development of projects Establish and implement sustainable and cost efficient energy
Wallis and Futuna	Overseas territory of France	255		14,200		High islands and atolls		
Vanuatu	Independent state	12,190	0.71	193,200	1231	High islands – a few small atolls	High electricity tariff rates Lack of human and institutional capacity High dependency on imported fossil fuels Need to develop alternate renewable energy techno (geothermal)	Economic development

ANNEX B: MAP OF THE PACIFIC ISLAND COUNTRIES AND TERRITORIES